2013 Open Water Peer Review Panel

Summary of Individual Reports

6 March 2013

2013 Panel Members

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Outline

1. Instructions for Review and Terms of Reference
2. Format of 2013 Panel Deliberations
3. Overview of IHA Applications Reviewed
4. Summary of 2013 Panel's Recommendations on Individual IHA Applications
5. Preview of 2013 Panel's General Report

Instructions for Review and Terms of Reference

Abbreviations and Definitions

- 4MP: Marine Mammal Monitoring and Mitigation Plan
- ESA: US Endangered Species Act
- Harassment: Under the 1994 Amendments to the MMPA, harassment is statutorily defined as, any act of pursuit, torment, or annoyance which
  - Level A Harassment: has the potential to injure a marine mammal or marine mammal stock in the wild; or,
  - Level B Harassment: has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

More Abbreviations and Definitions

- IHA: Incidental Harassment Authorization
- MMPA: US Marine Mammal Protection Act
- NMFS OPR: NMFS Office of Protected Resources
- Take
  - MMPA : "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.“

Background

- Marine Mammal Monitoring and Mitigation Plan (4MP) required in IHA application (MMPA section 101(a)(5)(D); NMFS implementing regulations, 50 CFR Subpart I)
- Where the proposed activity may affect the availability of a species or stock of a marine mammal for taking for subsistence purposes, proposed monitoring plans must be independently peer-reviewed prior to issuance of an IHA (50 CFR 216.108(d))

4MP Objectives

4MP objectives, as indicated by MMPA implementing regulations

1. Document the effects of the activity (including acoustic) on marine mammals
2. Document or estimate the actual level of take as a result of the activity
3. Increase knowledge of the affected species
4. Increase knowledge of anticipated impacts on marine mammal populations

4MP Objectives

Additional 4MP goals, recommended by NMFS, include:

1. Marine mammal presence, abundance, distribution, or density
2. The nature, scope, or context of the likely exposure of marine mammals to any potential stressor associated with the action
   A. The action itself (acoustics)
   B. Affected species (life history, dive patterns, etc.)
   C. Co-occurrence of species with the action
   D. Likely biological or behavioral context of exposure to stressor (age class; known pupping, calving, or feeding areas)

4MP Objectives

Additional 4MP goals, recommended by NMFS, include:

3. Marine mammals' behavioral or physiological response to specific stressors associated with the action
4. How anticipated individual responses to individual stressors or anticipated combinations of stressors, may impact either
   A. Individual long-term fitness and survival
   B. The population, species, or stock

4MP Objectives

Additional 4MP goals, recommended by NMFS, include:

5. Effectiveness of mitigation and monitoring measures
6. Manner in which the authorized entity complies with the incidental take authorization and incidental take statement
7. Increased probability of detecting marine mammals (improved technology or methodology), both within the exclusion zone and in general

Questions Posed to the 2013 Panel

1. Will the applicant's stated objectives effectively further the understanding of the impacts of their activities on marine mammals and otherwise accomplish the goals stated above? If not, how should the objectives be modified to better accomplish the goals above?

2. Can the applicant achieve the stated objectives based on the methods described in the plan?

3. Are there technical modifications to the proposed monitoring techniques and methodologies proposed by the applicant that should be considered to better accomplish their stated objectives?

Questions Posed to the 2013 Panel

4. Are there techniques not proposed by the applicant (i.e., additional monitoring techniques or methodologies) that should be considered for inclusion in the applicant's monitoring program to better accomplish their stated objectives?

5. What is the best way for an applicant to present their data and results (formatting, metrics, graphics, etc.) in the required reports that are to be submitted to NMFS? (NMFS' implementing regulations require IHA holders to submit a 90-day technical report that is due 90 days after completion of activities under the IHA.)

Format of 2013 Panel Deliberations

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- Meeting in Seattle, WA, 8-9 January 2013
  - Closed-door presentations by IHA applicants
  - Closed-door discussions among panel members
- Panel members assigned individual reports to draft based upon panel discussions and minutes of the meeting
- Individual reports circulated among all panel members
- Individual reports revised and final versions sent to NMFS OPR
- 2013 general report is currently in draft stage and in review by panel members. Final draft expected to be delivered to NMFS OPR on Friday, March 15th, 2013

Overview of IHA Applications Reviewed

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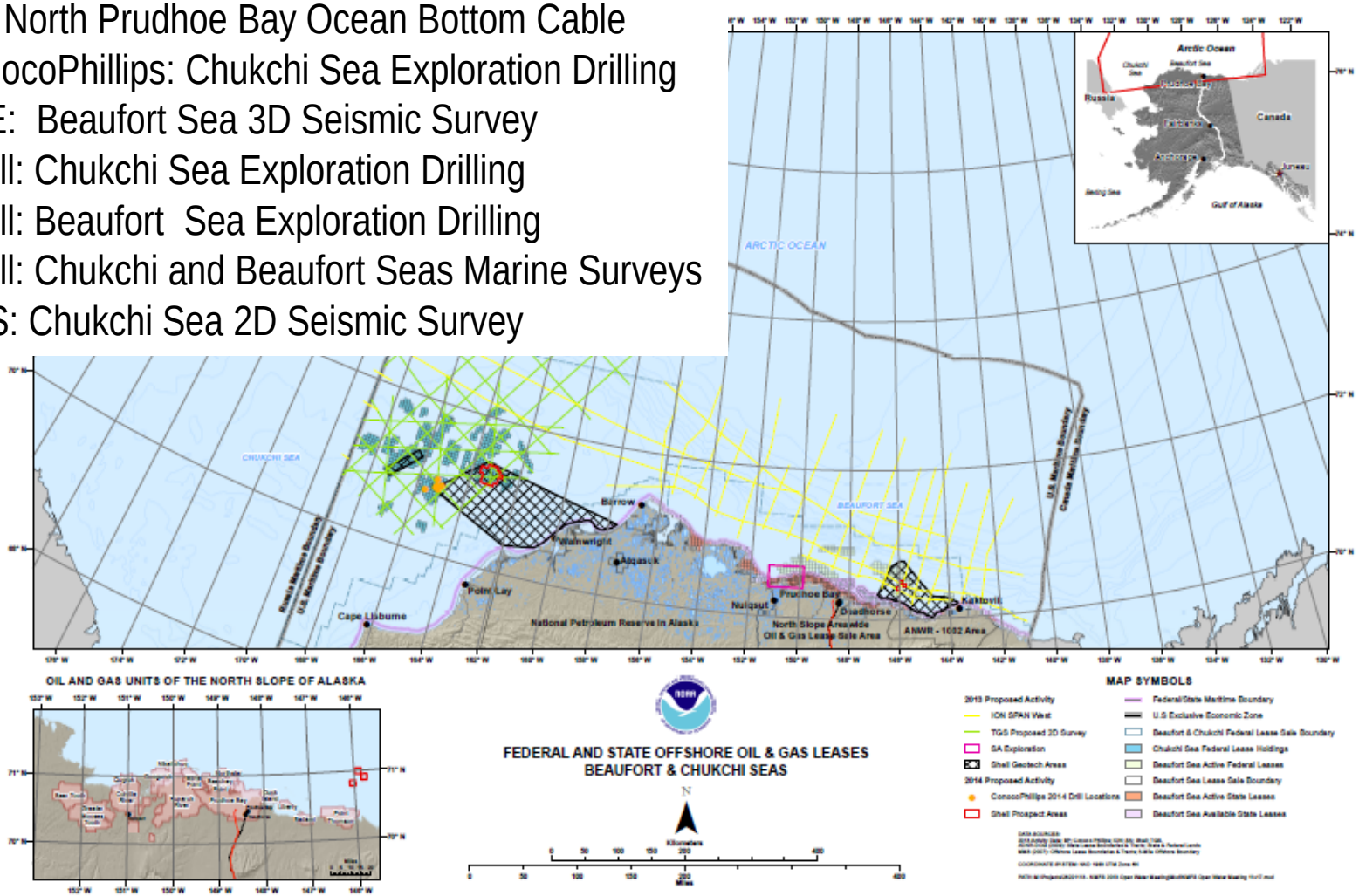
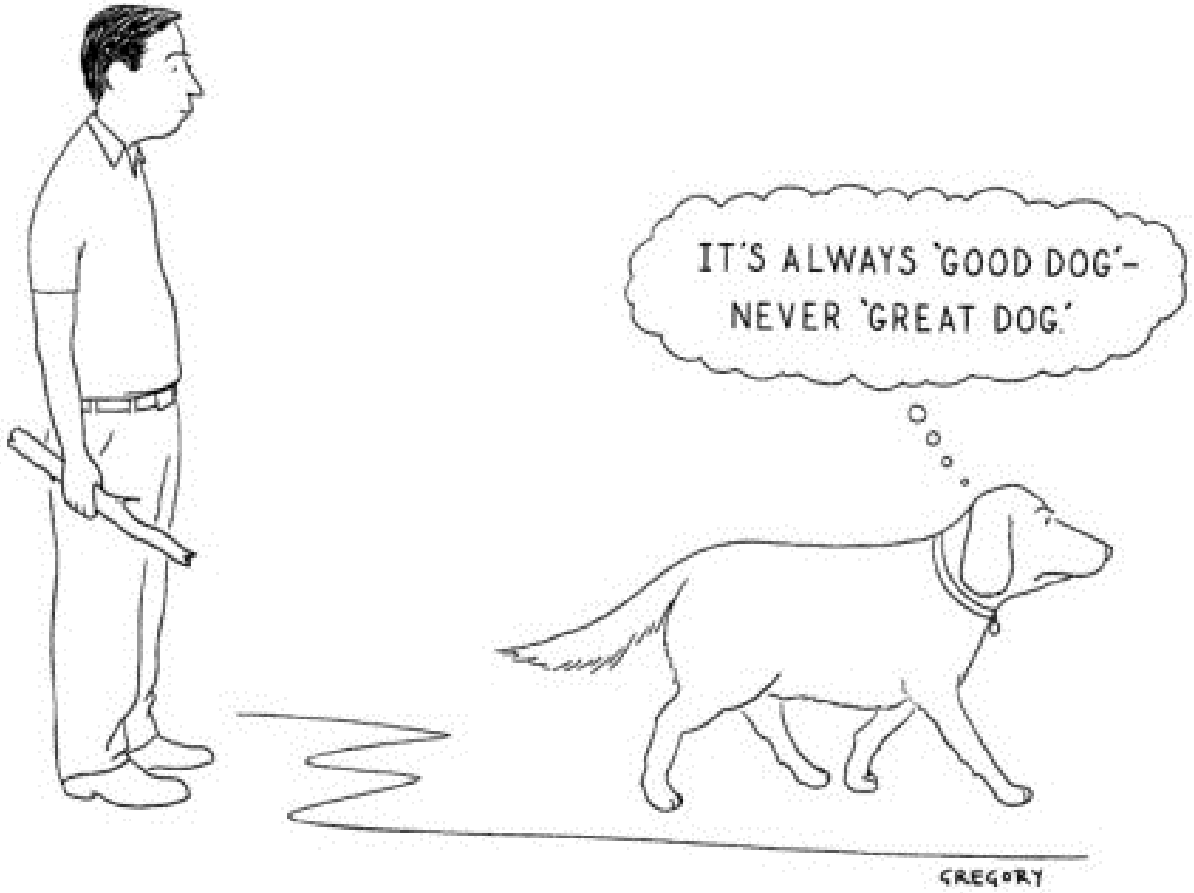
1. BP: North Prudhoe Bay Ocean Bottom Cable
2. ConocoPhillips: Chukchi Sea Exploration Drilling
3. SAE: Beaufort Sea 3D Seismic Survey
4. Shell: Chukchi Sea Exploration Drilling
5. Shell: Beaufort Sea Exploration Drilling
6. Shell: Chukchi and Beaufort Seas Marine Surveys
7. TGS: Chukchi Sea 2D Seismic Survey



Summary of 2013 Panel's Recommendations on Individual IHA Applications

Noted Improvements



Noted Improvements

- Willingness to consider and test alternative monitoring approaches
- Chukchi Sea Ecosystem Studies Program - COP, Shell, Statoil
- Shell's 2012 aerial surveys collecting high-resolution photo and high definition video data
  - Needs further testing and evaluation (pre-specify metrics)
- Suite of broadly distributed acoustic recorders
- PSOs
  - Data acquisition and archival software
  - Stationed on vessels most likely associated with impacts
  - Observation location on vessels optimized for sighting animals

What does a complete IHA application contain?

- An attainable, defensible, and detailed 4MP for the **panel** to review
- Overall objectives should be to provide reliable, **statistically robust** estimates of the number (and associated uncertainty) of marine mammals in the project area and information on their distribution and movement patterns, with sufficient **power** to determine if, and if so how, **all aspects** of the project's operations affect marine mammal density, distribution, and movements

Take Estimates

- Pre-season: Status quo is to take rough density estimates from aerial survey data and multiply by predicted acoustic footprint
  - Does not account for
    - Animal movement
    - Multiple takes on a single individual
    - Variability in density estimates due to occasional large groups of animals (belugas, seals, bowhead whales)
    - Cumulative effects
- Post-season: Low sample sizes & biased data

Take Estimates – Potential Solutions

I. Multiply by a temporal component

II. Provide two extremes:

   A. Lower Bound = Density * Area

   B. Upper Bound = Density * Area * Time

* Provide uncertainty estimates

Estimating Safety Radii

- Pre-season
  - Should be based on site-specific acoustic propagation models and empirical measurements, if at all possible
  - Should err on the precautionary side
  - Should include all sound sources
- On site
  - IHA application needs to specify types and quantities of data and levels of analyses necessary to meet sound source verification requirement

Protected Species Observers

- PSOs can likely implement mitigation measures to prevent or limit Level A takes because this typically relates to nearfield monitoring
- One PSO on duty at a time is insufficient for mitigation monitoring
- Increasing the number of PSOs on duty at one time increases detection probabilities only up to a point, but this leads to logistical issues
- Detection probabilities diminish drastically in darkness and bad weather
- PSOs should not focus on recording behavior at the expense of sighting animals

Protected Species Observers, Continued

- PSOs alone *cannot* estimate takes, evaluate impacts on marine mammals and subsistence activities, provide baseline data on marine mammal distribution, density, movement, or behavior
  - Observations are limited to animals that surface close to the observation platform
  - PSO data are not equivalent to rigorous scientific surveys
- PSOs must have the authority to implement mitigation actions (slow down or divert ship, ramp-down, shut-downs) when necessary and safe

Passive Acoustic Monitoring

- Effective tool for far-field monitoring
- Should:
  - Be conducted before, during, and after operation enters the project area
  - Be broad-spectrum
  - Include bottom-mounted recorders and near-real-time monitoring by sat phone (e.g., Iridium)
  - Allow localization and quantification of marine mammal acoustic detections (also allows for validation of predicted acoustic exposure levels)

Aerial Surveys

- Communication protocols among aerial survey programs should be established before season begins and followed throughout the season
- Aircraft should circle to estimate group size and determine whether calves are present

New Technology for Far-Field Monitoring

- Underwater vehicles
- Gliders
- Satellites
- Unmanned Aerial Systems
  - Communication protocols are essential

Acoustic Exposure Criteria

- Level B Harassment Radii
  - Distinction between 120 dB isopleth for “continuous” sounds and 160 dB isopleth for “impulsive” sounds is artificial
    - Reverberation and multipath arrivals blur this distinction
- Bowhead whale response to sounds <160 dB, so should monitor all activities out to 120 dB
  - Blackwell, S.B., Nations, C.S., McDonald, T.L., Greene, C.R., Thode, A.M., Guerra, M., and Macrander, M.A. in press. Effects of airgun sounds on bowhead whale calling rates in the Alaskan Beaufort Sea. Mar. Mamm. Sci. 24pp.
  - Schick, R. S., and Urban, D.L. 2000. Spatial components of bowhead whale (Balaena mysticetus) distribution in the Alaskan Beaufort Sea. Can. J. Fish. Aquat. Sci. 57:2193-2200.Schick and Urban, 2000

Other

- Handling/monitoring of discharge
- The definition of “non-seismic” should be stated explicitly in the IHA applications and any resulting analyses

Cumulative Effects

- Collaboration with other operators is essential
- Data collection and access
  - Record and archive all vessel and aircraft tracks and activity states
  - Make all activity logs, vessel/aircraft tracks, and monitoring data publicly available
  - Standardization needed
- Integration of data across observation platforms or monitoring methodologies and operators is needed

Cumulative Effects

- Include all aspects of operations when evaluating effects
  - Need to monitor and characterize the ensemble acoustic footprint
    - Spatially-explicit information on the sound field and activity states (dynamic positioning, in transit, at anchor)
    - Examine variability over time
    - Need acoustic signatures of all sound sources (ships, rigs, supply vessels)

Presentation of Results

- Useful summaries and interpretations of the results of the monitoring plan
  - Efficacy of monitoring and mitigation measures
    - Summarize any and all mitigation actions taken
  - Summary of measurements and observations
- Clear timeline and spatial representation of the operations and important observations

Preview of 2013 Panel's General Report

Preview of 2013 Panel's General Report

1. Take Estimates
2. Development of "Best Practices" for Mitigation Monitoring
3. Development of a Comprehensive Monitoring Plan for the Arctic
4. Integration of Information to Understand Cumulative Effects
5. Acoustic Exposure Criteria
6. Methods for Monitoring Ice Seals

Conclusions

- A new paradigm for managing anthropogenic activities in the Arctic is needed
- Important to obtain rigorous scientific baseline data on marine mammal distribution, density, behavior, movements, and potential for harassment from industrial activities before, during, after those activities occur

The panel would like to thank

- Robyn Angliss, Jolie Harrison, Candace Nachman, and Sheyna Wisdom for organizing, facilitating, and taking notes during the meetings
- The applicants, for [mostly] answering our questions and [sometimes] listening to our recommendations

Questions?